AQEC
Avionics Qualified
Electronic Component

AQEC – WHAT IS IT ?

A cooperative approach to working with the integrated circuit manufacturers to use their products in applications which require long life, hi-reliability & maintainability

AQEC – WHY

- The Aerospace industry must use commercially available products to manufacture the electronic systems necessary to support a high reliability long product life infrastructure
- All commercial products are not suitable for a high reliability long life product
- The AQEC program was developed as an approach to obtaining “information” from the I. C. manufacturers

AQEC – What are the Goals?

- Provide AQEC users access to information from the AQEC manufacturers necessary to use commercial-off-the-shelf products
- Better enable AQEC users to access which of these parts are capable of operating reliably in their applications
- Minimize deviations from the AQEC manufacturers standard commercial products
- Have minimal impact on the AQEC manufacturers standard operating or business procedures
- Promote communication between the AQEC manufacturers and users

Typical Avionics Temperature Environment

- The predominant user of electronic parts in the aerospace industry is commercial aviation
- All flight critical systems are redundant, typically triple redundant
- Most avionics is located in an environmentally conditioned equipment bay
- Specified temperature range is -40 to +70 C° with cooling air
- Data shows that environment is 20-25 C° >95% of the time
- -40 to +85 C° parts are adequate and appropriate

Note: AQEC parts are not expected to necessarily be appropriate for all aerospace applications, only the majority

Typical avionics radiation environment

- Atmospheric neutron radiation only
- All flight critical systems are redundant, typically triple redundant
- Microprocessors, FPGA's and memories are most sensitive parts
- Where neutron data is available, most microprocessors and memories are not adequately fault free
- Data is used to determine how much avionics system immunity must be designed into the system

WHAT INFORMATION

- Part wear out expectations (years)
- Effect of atmospheric neutron radiation (upset rate)
- Operating temperature vs. failure rate
- Maximum temperature for specified performance
- Part qualification information
- Lead termination material
- Counterfeit parts minimization program

AQEC – Status of Program

- Coordinate with DoD adoption of Mil-Std-3018 Parts management
- Working with largest commercial avionics OEM's to insure program is compatible with their needs
- AQEC standard revised to:
  - More accurately describe users needs
  - Incorporate international community input
  - More specifically delineate users criteria

Commercial Avionics AQEC Opportunities

Largest user of “Aerospace” parts

- Principal parts usage is -40 to +85 C° parts
  - Requirement for parts outside of -40 to +85 C° is “unusual”
- Largest commercial avionics OEM’s already collaborating on “common parts” scenario
- We are working with the commercial avionics OEM’s to collaboratively define a “common parts” program which includes AQEC.
- We will offer this “common parts/AQEC” program to the DoD for their use
- Majority of military products use commercial parts

International Participation

- GEIA-STD-0002-1 (AQEC) supplied to IEC
- Circulated to members of TC-107 for comment
- Added to TS-62239 as approved part for use in avionics systems
- Approved for release as IEC standard
- Being released as “Preliminary Available Standard” (PAS) to allow immediate availability

OUR GOALS

- Your agreement to work with us to develop a successful “common parts/AQEC” program
- Your critique of the AQEC standard
  - Any provisions that the majority of the part suppliers won’t agree with are not useful
- Suggestions to help make this program successful